IMPACT OF OUTWARD-LOOKING, MARKET-ORIENTED POLICY REFORM ON ECONOMIC GROWTH AND POVERTY

by

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EXECUTIVE SUMMARY

Since the early 1980s, when many developing countries experienced severe economic difficulties because of excessive market regulation and trade protection, a number of them have initiated extensive policy reforms These reforms have been designed to free up markets and to move these countries in a more outward-oriented direction. A major objective of the reforms has been to increase the importance of trade in Gross Domestic Product (GDP) by reallocating resources away from inefficient production of import-competing goods and nontradables, and towards production of exports. This should lead to increased growth of GDP not only because of static economic gains associated with the exploitation of comparative advantage and economies of scale but also because of a number of dynamic ways in which trade contributes to economic growth.

The empirical evidence for developing countries largely supports the theoretical arguments concerning the favorable impact of outward-looking, market-oriented policy reform on trade and growth. Nevertheless, recent experience in some countries, especially in Africa, has been disappointing. This may reflect the failure of reforms to be fully implemented or sustained. It may also be because of structural factors such as landlocked location, deteriorating terms of trade, or excessive concentration on primary product exports. Furthermore, many African countries may lack the physical infrastructure, human capital, and institutions that are necessary to take full advantage of the potential resulting from policy reform. Thus policy reform may be a necessary but not sufficient condition for expanded trade and growth, or, alternatively, the time required for these beneficial effects to occur may be longer where other conditions necessary for growth remain unsatisfied.

Outward-looking, market-oriented policy reforms have sometimes been criticized for having adverse effects on the poor. Much of this criticism has focused on the short run, before there has been sufficient time for the effects of reform on unemployment to be reversed by new investment in expanding sectors. But even if policy reform has had adverse short-term effects on the poor in some countries, and the evidence cited in this paper shows this to be far from universal, its long-term effects are likely to be positive, especially where reform contributes to more rapid economic growth.

While much of the empirical evidence supports the proposition that outward-looking, market-oriented policy reform stimulates trade and growth and that economic growth leads to poverty alleviation, most of this evidence applies to the industrial countries and the middle-income developing world. Relatively little of it includes the poorer countries, which appear to have

experienced the most difficulty in benefiting from these reforms. Nor do these studies analyze why reform has not been more successful in these countries. Furthermore most of the studies use data for years prior to the major reforms of the past decade.

In order to test the proposition that policy reform contributes to trade and growth, and that all of these lead to poverty alleviation, an econometric analysis was conducted across a broad spectrum of developing countries for the period from 1974 to 1993. In addition to indicators of economic policy, the analysis also included control variables related to the structure of the economy and to levels of economic development in order to determine why policy reform has not always been as successful as had been hoped.

The study starts by developing a number of hypotheses regarding linkages between policy reform, trade, growth, and poverty alleviation. Details regarding the origins of these hypotheses - - whether based on a review of the literature, the application of economic theory, or the experience of the authors in a number of countries that have undergone policy reform – are presented in Annex A. The study then discusses the econometric approach used. This involves dividing the data into five-year epochs, which correspond reasonably well to different world economic conditions facing the developing countries over the twenty-year period, i.e., moderate economic growth, with high prices for primary products and easy access to international capital (1974-78); economic stagnation, with capital markets increasingly closed to many LDCs (1979-83); moderate economic growth accompanied by prolongation of the international debt crisis, with structural adjustment programs required for many LDCs to get access to foreign capital (1984-88); and stagnation of world economy, with continuation and extension of structural adjustment programs (1989-93). Averages (or in some instances rates of change) for each five-year period and country are treated as separate observations in the analysis.

The relative importance of trade is measured in the regression analysis by the ratio of exports plus imports to GDP. Policy measures include the ratio of trade taxes to the value of trade, the ratio of the parallel market exchange rate to the official exchange rate, and an index of trade liberalization measures. Growth is defined in terms of the relative rate of growth of real per capita GDP, measured in international prices using the Purchasing Power Parity approach. The structural variables include total population, population density per unit of arable land, percentage of the population living in urban areas, per capita GDP in 1970, rate of growth of per capita GDP over the previous ten years, changes in the terms of trade, ratio of raw material exports to GDP in 1970, and whether or not a country is landlocked. The development variables include road density per unit of arable land, as a measure of infrastructure; average years of schooling per adult member of the population, as an indicator of education; and the ratio of the money supply (M2) to GDP, as a measure of institutional development.

Poverty alleviation in this study is measured as an unweighted average of indices for the following: access to health facilities, access to safe water, school enrollment at the primary level, life expectancy at birth, infant mortality, prevalence of child malnutrition, and literacy rate. One

advantage of this indicator is that it is a broader concept than household income, which does not include the value of services furnished by the public sector. A disadvantage of the indicator is that it measures some of the effects of poverty rather than poverty itself. Furthermore, it is as much an indicator of the effort by government to supply social services as it is of the effects that these services have had on the poor. Nevertheless, it is an important indicator of well-being for the poor.

The empirical results provide strong support for most of the hypotheses. Above all, **the results show the vital importance of outward-looking, market-oriented policy in promoting trade, growth, and poverty alleviation**. All three policy measures have an important influence on the ratio of trade to GDP. This in turn exerts a positive effect on economic growth, which is important in alleviating poverty. In addition, more open policies have a positive effect on economic growth independent of their influence on trade, and both lower trade taxes and more open policies have a favorable effect on poverty alleviation independent of their influence, either direct or indirect via trade, on economic growth. These are important findings, given USAID's commitment to trying to assure the success of policy reforms.

Among the development variables, education and especially institutional development are important in stimulating trade. The fact that the response of exports to policy reform has been slow in some countries may be primarily because of inadequate investment in human capital and in the institutional infrastructure required for trade. Lack of adequate physical infrastructure appears to be less of a problem, though more research is required before this can be said with certainty. The problem with existing infrastructure may be related more to quality than to quantity, and this in turn may be due to educational and institutional deficiencies. However, both road density and institutional development have a beneficial influence on poverty alleviation independent of their effects on trade and growth.

Concerning the effects of the structural variables, it seems clear that trade is most important for economies in which the size of markets is limited. On the other hand, higher population density contributes positively to trade because these countries are unable to satisfy their need for primary products from domestic sources alone. They are forced, therefore, to specialize in the production of manufactured goods, exchanging these for primary product imports. In the long run, this turns out to be highly beneficial, the results suggest, since countries that depend more on their natural resources for exports tend to grow less rapidly than those who base their exports on industrial goods.

Somewhat surprising is the strength and robustness of the positive influence of population size on growth of per capita GDP. Other things equal, a one percent increase in the size of the population will result in an increase in the economic growth rate of almost one percentage point. The mechanisms by which such gains are realized are not well understood. They may relate to the exploitation of economies of scale, to greater competition, or to an increase in the externalities associated with learning. More research is required here.

Also noteworthy is the lack of evidence for the hypothesis of economic convergence, i.e., countries that start further behind are likely to grow more rapidly than those that start with a higher per capita GDP. This is not because countries that start out with a lower per capita GDP have pursued less open policies, since this variable is controlled for. There is some suggestion that the evidence for convergence over longer periods of growth might be due to the differential impact of changes in the world economy on different countries. More research is required, however, to verify this.

A number of additional findings are also important. As expected, improvements in the terms of trade have a positive effect on economic growth. This effect, however is relatively weak. More surprising is the finding that being landlocked, other things equal, impedes neither trade nor growth. This finding is very robust and contradicts that of Sachs and Warner (1996), which is that landlocked countries, other things equal, grow less rapidly than those with direct access to the sea. This is another area for further research, especially in view of the fact that unrecorded trade is probably relatively more important in landlocked countries. The analysis also suggests that the rate of domestic savings has no influence on economic growth once the effects of population and the importance of trade are taken into account.

Poverty alleviation appears to be negatively correlated with population density, which is an indicator of pressure on the natural resource base. On the other hand, urbanization contributes positively to poverty alleviation, probably because it facilitates access to social services. Most important, however, is the very positive contribution that economic growth makes to poverty alleviation.

Furthermore, outward-looking, market-oriented policies, which contribute to poverty alleviation through trade and growth, also have a direct beneficial influence on poverty. Alleviation of poverty is strongly correlated with low rates of trade taxation and with open trade policies. This is hardly surprising in view of the fact that poverty is greatest in rural areas and these policies tend to favor those in the countryside. It is also clear that there has been substantial progress towards poverty alleviation over time that has been independent of these various explanatory variables.

These findings have important implications for USAID and the other donors. First, they strongly support the emphasis placed by the donors on economic policy reform as indispensable for economic growth. Second, they show convincingly that economic growth, as well as policy reform, is highly beneficial for poverty alleviation. Third, they indicate that USAID's funding of projects to promote the expansion of nontraditional exports is justified in terms of its impact on growth. Fourth, they suggest that high priority be given to the development of financial,

commercial, legal, promotional, fiscal, and other institutions. Fifth, they indicate that donors should support the promotion of industrialization for export. Finally, they show that construction, rehabilitation, and maintenance of rural roads has important implications for poverty alleviation.

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INTRODUCTION

Since the early 1980s, when many developing countries were experiencing severe economic difficulties because of excessive market regulation and trade protection, a number of them have initiated extensive policy reforms These reforms have been designed to free up markets and to move these countries in a more outward-oriented direction. The reforms have included deregulation of markets, reduction in or elimination of taxes and subsidies on marketing and trade, devaluation, movement towards more flexible exchange rates, dismantling of quantitative restrictions on imports, harmonization of import tariffs, and establishment of preferential regimes to promote exports via directed credit schemes and exemption from taxation of inputs used in the production of exports.

A major objective of the reforms has been to increase the importance of trade in Gross Domestic Product (GDP) by reallocating resources away from inefficient production of import-competing goods and nontradables, and towards production of exports. This should lead to growth of GDP not only because of static economic gains associated with the exploitation of comparative advantage and economies of scale but also because of a number of dynamic ways in which trade contributes to economic growth. These include technological transfers associated with trade and investment, increased efficiency resulting from greater competition in foreign and domestic markets, accumulation of commercial and managerial experience, acquisition of skills by the work force, growth of employment in the face of population pressure, and increased foreign exchange earnings available for the importation of capital equipment. In addition, according to the new "endogenous" growth theory, openness to trade increases returns to innovation (Harrison 1991). Finally, the reforms may impact growth directly by, for example, reducing the importance of rent-seeking and lowering the cost of domestic marketing.

The empirical evidence for developing countries largely supports the theoretical arguments concerning the favorable impact of outward-looking, market-oriented policy reform on trade and growth.[1] Nevertheless, recent experience in some countries, especially in Africa, has been disappointing. Despite a substantial record of policy reform in many African countries during the 1980s, GDP per capita in Africa fell by 0,6% from 1987 to 1994, virtually the same performance as during the previous ten years (Sachs, 1996). This poor record of growth may be due to a number of causes. First, it may reflect the failure of reforms to be fully implemented or sustained. It may also be because of structural factors such as landlocked location, deteriorating terms of trade, and natural resource abundance.[2] Furthermore, many African countries may lack the

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[1]For a review of much of the evidence relating policy to trade and growth, see Edwards (1993). An important recent study is Sachs and Warner (1995a).

[2] Recent evidence suggests that natural resource abundance may have a negative influence on growth, perhaps because of a Dutch Disease effect or because it makes exports less sensitive to policy (Sachs and Warner, 1995b). The Dutch Disease refers to the tendency for the real

physical infrastructure, human capital, and institutions that are necessary to take full advantage of the potential resulting from policy reform. Thus policy reform may be a necessary but not sufficient condition for expanded trade and growth, or, alternatively, the time required for these beneficial effects to occur may be longer where other conditions necessary for growth remain unsatisfied.

Even where outward-looking, market-oriented policy reforms have succeeded in stimulating growth, they have sometimes been criticized for having adverse effects on the poor (Jolly 1987). The Cornell Food and Nutrition Policy Program was enlisted by USAID in 1988 to examine this critique insofar as it applies to structural adjustment in Africa. Its conclusion was that the poor have not, in general, been adversely affected by structural adjustment. The major reason for this is that most of the poor in Africa live in rural areas and are sufficiently isolated from the mainstream of the economy and from access to public services that they have not suffered extensively from structural adjustment programs. Cornell's analysis has been faulted, however, for not paying sufficient attention to exceptions to this general finding (Stryker and Rogers, 1992, 24). Furthermore, it does not deal with the issue of whether the poor benefit from the favorable effects of structural adjustment on economic growth.[3] Finally, there is evidence that structural adjustment in Latin America has had an adverse short-run impact on the urban poor, who tend to be more closely integrated into the market economy and to have better access to public services than in Africa (Sahn, 1992).

Even if policy reform has had adverse short-term effects on the poor in some countries, and the evidence cited above shows that this is far from universal, its long-term effects are likely to be positive, especially if reform contributes to more rapid growth. This has been demonstrated rather convincingly with the publication of two recent working papers looking at the effects of economic growth on relative income inequality and on the absolute level of poverty (Deininger and Squire, 1996; Ravallion and Chen, 1996). Using a carefully selected data set comprising over 650 observations on the quintile distribution of income for 108 countries, Deininger and Squire find a strong positive correlation between growth in aggregate per capita income, on one hand, and increases in per capita income of all except the top quintile, on the other. A similar result is statistically confirmed by Ravallion and Chen using a slightly different definition of the level of poverty. The implication of these findings is that economic growth appears to be important to poverty alleviation.

Annex A offers a detailed analysis of why this might be so, based on a survey of much of the available literature. Here we are concerned specifically with how outward-looking, market-oriented policy reform acts in the long run to alleviate poverty – whether directly or through its impact on trade and growth. One example is the increase in wages and employment that accompanies successful outward-oriented reform. Wage rates tend to be low in poor countries,

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exchange rate to be overvalued because of rapid expansion of a few primary product exports. This makes it difficult to diversify the export base to include a broader range of agricultural and manufactured goods.

[3]This issue is explored for four African countries in Stryker, Shaw, Rogers, and Salinger (1994). Critical factors in determining participation by the poor in modern economic growth include access to markets, infrastructure, and public social services, especially education.

meaning that these countries are likely to have a comparative advantage in the production and export of labor-intensive products.[4] Exploitation of this advantage through expanded trade as a result of policy reform creates more demand for labor, absorbing some of the unemployed and underemployed. So does the economic growth that results from reform. This, together with any rise in wage rates, leads to greater incomes for the poor. This process may be slowed, however, if some of the conditions for increased trade and growth are lacking, such as efficient markets for reallocating capital and labor into the labor-intensive export sector. Then the adverse effects on employment of lowering protection of existing industries may offset the positive effects of expanded exports – at least for a time.

Another effect of policy reform on the poor results from the impact that it has in stimulating savings through growth of income. This provides resources for investment in human and non-human capital, leading to an increase in the demand for labor, a rise in labor productivity, and higher incomes for the poor. It also enhances the welfare of the poor through better health services and other non-pecuniary benefits. The experience in East Asia, for example, suggests that economic growth and poverty reduction go hand in hand (World Bank 1993). But for this to occur, policy reform must be successful in stimulating growth. In part this may result from expanded trade, but other conditions intervene as well, which may slow the growth process. For example, as noted above, a country that is rich in natural resources and highly specialized in the exportation of primary products may not respond as positively to policy reform as one that is poised for growth in the industrial sector.

While much of the empirical evidence supports the proposition that outward-looking, market-oriented policy reform stimulates trade and growth and that economic growth leads to poverty alleviation, most of this evidence applies to the industrial countries and the middle-income developing world. Relatively little of it includes the poorer countries, which appear to have experienced the most difficulty in benefiting from these reforms. Furthermore, many of these studies, the results of which are surveyed in Annex A, use data applying principally to the years prior to the major reforms of the past decade. Thus it is important not only to identify the extent to which recent policy reforms have led to increased trade, growth, and poverty alleviation but also the factors inhibiting the positive impact of these reforms. This will enable USAID and the other donors to assess the extent to which their aid programs have been oriented in the right direction and how these programs might be strengthened to increase their impact on economic growth and poverty alleviation.

Towards this end, an econometric analysis was conducted across a broad spectrum of developing countries for the period from 1974 to 1993. Such an analysis is possible now that a large body of country-level data has become available for the past thirty or so years from the World Bank, International Monetary Fund, and other sources. While a few studies have already been undertaken using these data (e.g., Sachs and Warner, 1996), much remains to be done. In particular, the present study explores the ways in which outward-looking, market-oriented policy

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[4] In order for low wages to translate into comparative advantage in labor-intensive products, this wage advantage must not be offset by low labor productivity in these industries relative to average productivity throughout the economy.

reform influences growth and poverty through its impact on trade. This is especially important given USAID's commitment to trying to assure the success of these reforms via its projects to facilitate the responsiveness of trade, and especially nontraditional exports, to policy reform.

The methodological approach used in this study involved two steps. First, the study developed a number of hypotheses regarding linkages between policy reform, trade, growth, and poverty alleviation. Second, econometric analysis was undertaken using cross-country data to test these hypotheses and to investigate the circumstances under which these linkages operate. The development of the hypotheses linking outward-looking, market-oriented policy reform, foreign trade, economic growth, and poverty alleviation is described in detail in Annex A. These hypotheses are based on a review of the literature, the application of economic theory, and the experience of the authors in a number of countries that have undergone policy reform. The hypotheses are summarized in the next section, together with the conceptual framework elaborated to describe them. Following this, the econometric approach used to test these hypotheses is described in detail. The results are then presented, after which the final section draws some conclusions and recommendations.

HYPOTHESES REGARDING POLICY, TRADE, GROWTH, AND POVERTY

A. Overview

The linkages between policy, trade, growth, and poverty can be analyzed using the conceptual framework illustrated by the following diagram:
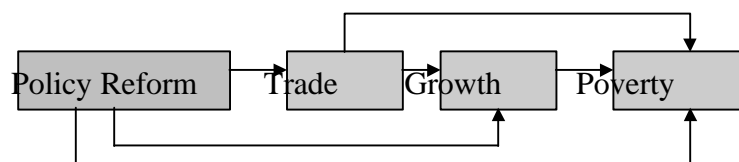
Thus outward-looking, market-oriented policy reform may increase trade, which may contribute to growth, which may help to alleviate poverty. But policy reform may also affect growth directly, and both trade and policy reform may have direct effects on poverty as well. For example, economic growth contributes to poverty alleviation by increasing public revenues, which enables the government to provide better social services. At the same time, an expansion of labor-intensive exports increases the demand for the labor services of the poor. Finally, policy reform may in itself improve conditions for the poor, e.g., by increasing producer prices for rural farmers, even if there is no response in terms of trade and growth.

The impact of policy on trade and growth may be felt in several ways. First, an outward-looking, market-oriented policy profile should, other things equal, result in a larger share of trade in the overall economy than where the policy environment is focused in a more inward-looking

direction. This would be indicated, for example, by a higher ratio of exports plus imports to GDP. In addition, the establishment of an outward-looking policy environment should also influence economic growth This might occur in three different ways. First, to the extent that this environment increases the relative importance of trade, this should have a favorable impact on economic growth for the reasons cited above. Second, the establishment of an outward-looking, market-oriented policy environment might influence growth directly even if there is no change in the importance of trade. Third, this environment might result in more rapid rates of growth of exports and imports, and these higher rates of growth of trade may be associated with more rapid growth of GDP. The problem with understanding the third influence, both theoretically and empirically, is that it is very difficult to separate cause and effect since exports are a part of GDP and imports are tied very closely to GDP. More rapid growth of trade would almost by definition imply more rapid growth of GDP. This is less true of the relationship between the level of the relative importance of trade in GDP and the growth of GDP. Therefore, the analysis in this paper concentrates on the first two ways in which policy influences growth, though it is recognized that we may be losing some of the dynamic effects related to the growth of trade.

The analysis thus far has assumed a single direction of causation. It is also possible that there are feedback effects. One of the most significant of these is the possibility that poor economic performance may influence policy, as it has recently in many developing countries. This is will likely occur with a lag, however, and the more immediate direction of causation is likely to be from policy to trade and growth. It is also possible that, in addition to economic growth resulting in a reduction of poverty, alleviation of poverty may contribute to more rapid growth by increasing investment in human capital.[5] Once again, the lags are likely to be considerable, in both directions.

B. Hypotheses

The major hypothesis to be tested is that policy matters. In particular, we are interested in the extent to which outward-looking, market-oriented policy reform has a positive impact on economic growth and poverty alleviation, either directly, or indirectly via its impact on trade. The dimensions of policy reform that are of interest include effective rates of trade taxation, the importance of quantitative restrictions on trade, and the extent to which markets are regulated or controlled. Effective rates of taxation may differ from nominal rates because of exemptions, smuggling, or other means of tax avoidance or evasion. Quantitative restrictions may take the shape of import licensing, foreign exchange controls, and bans on exports or imports. Finally market restrictions and other controls may take many forms, including price regulation and restriction of marketing to public sector marketing boards and trading agencies.

It is hypothesized from the literature review in Annex A that a decrease in the rate of trade taxation, a reduction or elimination of quantitative restrictions on trade, and a decline in market regulation and control will increase the importance of trade in GDP. It is also hypothesized that greater relative importance of trade will be positively associated with a higher rate of growth of

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[5] Moon and Dixon (1992) provide convincing empirical evidence of the important impact that investment in health and education can have on economic growth.

per capita GDP. In addition, it is also hypothesized that policy reform will be positively correlated with rate of growth of per capita GDP, holding constant the effect of trade. That is, even if there were no expansion of trade following policy reform, the effects of reform would still be beneficial to economic growth. For example, reduction or elimination of quantitative restrictions on trade should decrease the extent of rent-seeking and thus conserve resources that would otherwise be squandered.

As far as poverty is concerned, it is clear from the theoretical and empirical literature that more rapid economic growth should contribute to poverty alleviation. There is also a case to be made that greater importance of trade in the economies of poor countries should increase the demand for labor and thus help to alleviate poverty. On the other hand, to the extent that the poor are deprived of market opportunities because of lack of infrastructure or physical isolation, these effects may not be that important. Finally, there may also be a direct impact on poverty of policy reform, aside from its effects on trade and growth. Many of the poor live in rural areas, for example, and to the extent that lower taxes on trade or fewer market restrictions raise producer prices for agricultural products, this should benefit the poor, even if there is no expansion of output.

In addition to the impact of policy, either directly or indirectly through its effects on trade and growth, other variables associated with development have an important influence on trade, growth, and poverty alleviation. Examples include physical infrastructure, investment in education, and institutional development Where there is little infrastructure, people are poorly educated, and institutions are weak, the impact of policy may be overshadowed. Our hypothesis, then, is that these variables are positively correlated with trade, growth, and poverty alleviation and that a low state of development of these variables can offset the influence of policy reform.

Finally, there are a number of structural variables that need to be included in the analysis to avoid bias in the parameter estimates of the model and because these variables are important in their own right and could themselves offset the effects of policy. The first of these is the absolute size of the population. Other things equal, a country with a larger domestic market can be expected to engage in less foreign trade in relation to its GDP than one with a smaller market (Perkins and Syrquin, 1989). In part, this has a simple geographical explanation related to transportation costs and to the fact that the length of a country's frontiers grows less rapidly than its internal area as that area expands.[6] In addition, the ability to exploit economies of scale by relying on the domestic market is more limited the smaller is the size of the market.

Population size may also be important in explaining the rate of growth of per capita GDP. The theoretical reasons for this, however, have not been fully developed.[7] One possible explanation has to do with exploitation of economies of scale, though this source of growth is

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[6] To take two extreme cases, if market exchange were equally distributed between all households on the globe and if the entire globe were one country, then all exchange would be domestic. On the other hand, if every household were an individual country, then all trade would be foreign. Perkins and Syrquin (1989, 1709)

[7] Perkins and Syrquin (1989, 1735-39) find that large countries on average grew faster than small countries during the period 1960-82, primarily because of differences in the growth of productivity rather than of capital and labor inputs.

likely to be limited except for the smallest countries (Perkins and Syrquin, 1989, 1715). Another might be the greater competition that exists in larger markets, especially if they are protected from imports. A third explanation relates to endogenous growth theory, which states that skills developed in one area of the economy may spill over to other areas, raising productivity throughout the economy (Romer, 1986). If this happens more easily within than across national boundaries, countries would benefit from being larger.

Another structural variable associated with population is population density. The higher is the density of population, the more limited are the natural resources available to each person, and, other things equal, the greater is the extent of poverty. Higher population density also forces a country to increase its foreign trade to make up for this resource deficiency, and this effect grows in importance as population density continues to increase. But population density also has its positive effects in that higher population density lowers the per capita cost of domestic transportation, marketing, and administration.[8] These positive effects also occur with urbanization. It is much less costly to deliver public services, such as health and education, to people living in the cities than in the countryside. This is one reason why the poor tend to be found more in rural areas (Sahn, 1990).

The level of per capita GDP is also an important structural variable. Its effects on trade are multiple. Since exploitation of economies of scale due to larger market size is related more to GDP than to population, both population and per capita income should be used to explain the decline in the importance of trade with market size. On the other hand, as per capita GDP rises, demand becomes more differentiated, which increases the number of goods demanded and limits the size of the market for any particular good (Perkins and Syrquin, 1989, 1714).

The level of per capita GDP may also have an effect on its rate of growth. For example, economic convergence would occur if poorer countries were able to reap the "advantages of backwardness" by importing capital and technology from the richer countries and so close the income gap between the two. The fact that this has not occurred may be because the poorer countries have kept their economies closed to trade (Sachs and Warner, 1995a, 2-3). On the other hand, endogenous growth theory implies that more advanced countries continue to gain from internal technological spillovers that are less available to poorer countries. Mancur Olson (1996) has also suggested that poor countries may remain poor because they lack the institutional environment to attract capital and technology from the richer countries. Similarly, Baumol, Nelson, and Wolff (1994, p. 65) argue that the poorest countries may lack the human capital to take advantage of technology and knowledge, and that there may be a "convergence club", limited to middle income countries that benefit from moderate backwardness.

Another important structural variable is the terms of trade facing a country. The terms of trade are defined here as the ratio of the prices of a country's exports to the prices of its imports. If the terms of trade improve, i.e., the prices of the country's exports rise relative to those of its imports, the country's national income or GDP increases. This is one potential source of growth of per capita GDP.

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[8] Stryker (1977)

Other structural variables relate to the geographical situation of a country. For example, a country that is landlocked will have higher transportation costs to and from overseas markets than one that has direct access to the sea. This will not, however, be a disadvantage for trade with bordering countries. Similarly, a country that is a long distance from major markets will also incur higher transportation costs for trade with those markets. Whether these higher costs are a major factor inhibiting trade and growth is an empirical question, however, since once goods are loaded the cost of sea transportation is relatively low.[9]

SPECIFICATION OF ESTIMATING EQUATIONS

The foregoing hypotheses are tested in this paper using econometric analysis of cross-section data for 83 developing countries over a period of 20 years. Before proceeding to the detailed specification of the estimating equations, it is useful to conceptualize the variables and their relationships in the following form.

$$T = \alpha_0 + \alpha_1 PR + \alpha_2 S + \alpha_3 D$$

$$G = \beta_0 + \beta_1 PR + \beta_2 T + \beta_3 S + \beta_4 D$$

$$POVALL = \gamma_0 + \gamma_1 PR + \gamma_2 T + \gamma_3 G + \gamma_4 S + \gamma_5 D$$

where T = the relative importance of trade in GDP, PR = policy reforms, S = structural variables, D = development variables, G = growth of per capita GDP, and POVALL = poverty alleviation. Alternative specifications of the variables are used to estimate this model. For example, the relative importance of trade in GDP is measured by the ratio of exports plus imports to GDP. Policy measures include the ratio of export taxes plus import taxes to the value of exports plus imports, the ratio of the parallel market exchange rate to the official exchange rate, and an index of trade liberalization measures. Growth is defined as the relative rate of growth of real GDP per capita. The structural variables include total population, population density per unit of arable land, percentage of the population living in urban areas, per capita GDP in 1970, rate of growth of per capita GDP over the previous ten years, current trend in the terms of trade, ratio of raw material exports to GDP in 1970, and whether or not a country is landlocked. Finally, the development variables include road density per unit of arable land, as a measure of infrastructure; average years of schooling per adult member of the population, as an indicator of education; and the ratio of the money supply (M2) to GDP, as a measure of institutional development.

Poverty alleviation in this study is measured as an unweighted average of indices (from 0 to 100) for the following: access to health facilities, access to safe water, school enrollment at the primary level, life expectancy at birth, infant mortality, prevalence of child malnutrition, and literacy rate. One advantage of this indicator is that it can be calculated for all of the countries in the sample because data are available for at least some components of the indicator for each

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[9] Chile is a prime example of a country that has achieved impressive growth of per capita GDP despite being a very long distance from major markets.

country. Another advantage is that it is a broader concept than household income, which does not include the value of services furnished by the public sector. A disadvantage of the indicator is that it measures some of the effects of poverty rather than poverty itself. Furthermore, it is as much an indicator of the effort by government to supply social services as it is of the effects that these services have had on the poor. Nevertheless, it is clear that this is an important indicator of well-being for the poor.

A. VariablesVARIABLES:

The following is the list of variables used in the estimating equation.

TRADE = ratio of exports plus imports to GDP

GDPCAP70 = real per capita GDP in 1970 (measured in Purchasing Power Parity (PPP) prices)

GRGDPCAP = growth of real per capita GDP in the current period

GRGDPCAP10 = growth of real per capita GDP over the 10 years previous to the current period

POVALL = indicator of poverty alleviation, consisting of an index which includes school enrollment at the primary level, life expectancy at birth, infant mortality, access to health facilities, access to safe water, literacy rate, and prevalence of child malnutrition

TT = ratio of taxes on exports plus taxes on imports to the value of exports plus imports

PO = ratio of parallel exchange rate to official exchange rate

OP = years of open policies (Sachs and Warner index)

POP = total population

POPDEN = ratio of total population to area of arable land

URB = ratio of urban population to total population

GRTOT = annual rate of change of the terms of trade index (1987=100)

LOCK = landlocked

RAWGDP70 = ratio of primary product exports to GDP in 1970

RL = ratio of roads (km) to area of arable land

SCHOOL= average years of schooling per adult member of the population

INST = institutional development, measured by the ratio of money supply (M2) to GDP

SAVGDP = ratio of domestic savings to GDP

D2, D3, D4 = dummy variables for the second, third, and fourth five-year periods.

Most of the data are taken from the World Bank, World Data 1995 . The variables are constructed from as many years of annual data as are available for four five-year periods (1974-78, 1979-83, 1984-88, 1989-93). These periods correspond, more or less, to periods of different economic conditions in the world economy. The first period (1974-78) was one of a generally favorable economic climate, when many countries expanded their exports and borrowed freely on international capital markets. The next period (1979-83) was one of economic shock, partly because of previous borrowing, during which many countries exhausted their credit lines and were forced to begin negotiations with the international financial institutions (IMF and World Bank). During the third period (1984-88), many countries had to initiate structural adjustment programs to deal with their balance of payments crises and to gain access to international capital. These programs were often extended and broadened during the last of the four periods, which was generally one of stagnation in the world economy (1989-93).

GDP per capita (GDPCAP) is drawn from the Penn World Tables (Mark 5.6) and is expressed in 1985 international prices (dollars) adjusted for inflation and distortions in the exchange rate using the Purchasing Power Parity approach.[10] Five and ten year growth trends in GDP were estimated using ordinary least squares regression analysis.

The poverty alleviation indicator (POVALL) is an unweighted averages of indices, adjusted to 0 to 100 across the sample, for the indicators listed. For many countries, the availability of data for some of these indicators is quite limited, so averaging the indices avoids a significant reduction of the sample size. This may bias the indicators to the extent that the data for a particular variable are available only for richer countries but are assumed in the index to extend across the entire sample. To test for this, an alternative index was used that consisted of only the first three of these indicators, which were available for more countries than the other indicators. The differences between the two indices were minimal, however, so only the results of the broader index are presented here.

The ratio of taxes on exports plus taxes on imports to the value of exports plus imports (TT) measures the impact of the fiscal system on incentives to trade. Since actual tax revenues are used rather than official tax rates, the measure corrects for tax exemptions, which lower

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[10] For a discussion of the way in which PPP and GDP are estimated in the Penn World Tables, see Summers and Heston (1991). The Penn World tables have been updated (mark 5.6) to include observations through 1992.

collected tax rates in comparison with official rates.[11] However, the measure does not correct for smuggling or underinvoicing. Furthermore, it has a bias in that it understates the importance of higher tax rates, which tend to discourage trade and thus are not weighted as heavily.[12] This same bias exists, however, for any index of official or collected tax rates that uses actual trade as weights.

The ratio of the parallel market exchange rate to the official exchange rate (PO) is a proxy for restrictions on trade and foreign exchange. In most developing countries where quantitative restrictions on imports have been in effect, the major reason for this has been to conserve reserves of foreign exchange. Consequently, these restrictions on trade have usually been accompanied by controls on foreign exchange. The severity of these controls is indicated by the exchange market premium, that is the degree to which excess demand for foreign exchange is reflected in a higher price on the parallel than on the official market for foreign exchange. What this indicator fails to capture is restrictions on trade that are not accompanied by exchange controls. Perhaps the most notable example of this is outright bans on certain types of trade.[13]

The variable describing openness (OP) is derived from Sachs and Warner (1995a), which classifies countries as open or closed according to the black market exchange rate premium, the influence of export marketing boards, the coverage of quotas on imports of intermediate and capital goods, and the presence of a socialist government. For the purposes of this research, we have defined the variable as the number of years within each five-year period during which a country is considered open according to Sachs and Warner.

Population density (POPDEN) and density of the road network (RL) are defined in terms of area of arable land rather than total land to avoid the bias that results when population is concentrated in only part of the country. Landlocked (LOCK) measures the geographical bias against trade. The variable is constructed with values of 0 or 1 assigned to each country according to whether the country has access to the sea, either directly or via navigable rivers. Landlocked countries with no access to the sea are assigned a value of 1 while countries with access to the sea are assigned a value of 0. The ratio of primary product exports to GDP in 1970 (RAWGDP70) is a proxy variable used to indicate the natural resource base of a country at the beginning of the period analyzed

Road density (RL) is but one measure of physical infrastructure, but one that is widely available and is especially relevant for poverty alleviation because of the large percentage of the poor who live in rural areas. Average years of schooling per adult member of the population (SCHOOL) is a broad indicator of education that is available for most of the countries included in the analysis. Institutional development (INST) is represented by a proxy variable – the ratio of

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[11] Pritchett and Sethi (1994) find for Jamaica, Kenya, and Pakistan that collected tax rates may be as low as 60 percent of official rates, that the correlation between the two is weak, and that collected tax rates increase with official rates but much less than proportionately.
[12] At the limit, a completely prohibitive tariff would not be included in the measure at all since the weight of this category would be zero.
[13] As an example of this, Nigeria in 1986 abandoned import licensing and most controls on foreign exchange. As a result, for the next few years there was very little difference between parallel market and official exchange rates. However, imports of many foods and other products were officially banned to protect domestic industries.

the money supply (M2) to GDP. This is a good measure of the degree of development of financial intermediation, which, it turn, is closely related to the development of other institutions.[14]

The ratio of domestic savings to GDP (SAVGDP) was also tested as an explanatory variable because of its inclusion in other cross-country studies of economic growth (e.g., Sachs and Warner, 1996b). Although, strictly speaking, the savings rate depends on a number of behavioral and policy variables that are not the subject of this paper, it was felt that it would be important to see whether omission of the savings rate would bias the results. It turned out not to be significant.

Preliminary analysis indicated the importance of trade in explaining the ratio of investment to GDP and the importance of the investment ratio in explaining growth.[15] However, it was recognized that investment is more of an endogenous intermediate variable than one with basic explanatory power. The factors that influence the relative importance of trade and how trade affects growth are not obvious in comparison with the fact that countries with higher rates of investment grow faster. Consequently, this paper does not attempt to determine the sources of growth of per capita GDP in terms of investment or changes in total factor productivity. Rather, it focuses on the policy, structural, and state of development variables that influence both trade and growth.

B. Estimating Equations

The estimating equations used to test the various hypotheses described above were specified in double logarithmic form, except for those in which growth of per capita GDP or the index of poverty alleviation was the dependent variable, in which case a semi-log specification was used. The variables tested in each estimating equation are as follows:

DEPENDENT INDEPENDENT

TRADE   POP, POPDEN, GDPCAP70, RAWGDP70, LOCK, PO, TT,
               OP, RL, SCHOOL, INST, D2, D3, D4

GRGDPCAP   POP, POPDEN, GDPCAP70, GRTOT, RAWGDP70, LOCK,
               TRADE, PO, TT, OP, RL, SCHOOL, INST, SAVGDP, D2,
               D3, D4

POVALL   POPDEN, URB, GDPCAP70, GRGDPCAP10, RAWGDP70,
               LOCK, TRADE, PO, TT, OP, RL, INST, D2, D3, D4

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[14]Gillis, Perkins, Roemer, and Snodgrass (1996, 333-36) argue that the increase in liquid assets that accompanies growth of per capita income is a good measure of financial deepening, or the growth of financial intermediation. It also appears that where financial deepening occurs, there is strengthening of commercial and other institutions associated with development.

[15] These relationships have been found to be very robust across substantially different specifications of econometric models explaining investment and growth (Levine and Renelt, 1992).

In estimating these equations, the data were averaged over five-year periods to allow for broader coverage where there were missing observations and to reduce the effects of unusually large year-to-year variations. In addition, this meant that the data set did not vary greatly from one specification to another because of missing observations. Where data were missing, averages were calculated for the years for which there were data. Each five-year period for a given country was treated as a separate observation. As noted above, the periods comprising 1974-78, 1979-83, 1984-88, and 1989-93 correspond reasonably well to different economic conditions in the world economy.

Growth of per capita GDP (GRGDPCAP) and changes in the terms of trade (GRTOT) were estimated as trends over five-year periods using log-linear regressions of each dependent variable against time. In addition, growth of per capita GDP was calculated as a trend variable over the ten years preceding each five year period (GRGDPCAP10) in order to examine the effects of past growth on current poverty alleviation.

Every effort was made to make the equations recursive rather than simultaneous. For example, the level of per capita GDP was treated as exogenous by introducing its value in 1970, well before the period of the analysis. Similarly, in order to avoid any problems of simultaneity between growth and poverty alleviation, growth was introduced as a ten-year trend prior to the period during which poverty alleviation was measured. Regarding one particular variable for which it was impossible to avoid simultaneity -- TRADE – two-stage least squares was used when it was introduced as a explanatory variable.

The other major problem is multicollinearity. In any sample of data, whether cross-section or time-series, there are bound to be a number of variables that tend to move together. This may be because of single lines of causation between the variables, because of simultaneous lines of causation in several directions, or because the variables are linked with third variables. Sorting out multicollinearity is never easy. One cannot simply omit some of the variables, because this will bias the coefficients of the others. Instead, we tried to identify irrelevant variables, remove them from the equation, and then deal with the remaining variables in as straightforward a fashion as possible.

C. Diagnostics

In addition, a series of diagnostic tests were run where these pertain to cross-section data (Kennedy, 1996, 78-81).

Heteroskedasticity

All regressions were tested for the presence of heteroskedasticity (non-constant variance of the error terms). Heteroskedasticity was detected in the estimation of the regressions explaining TRADE. The White correction was therefore applied to these regressions.

Omitted and Irrelevant Variables

Several tests were run to determine the presence in the regressions of irrelevant variables and omitted known and unknown variables.   In the TRADE equations, the three dummy variables specifying the different time periods were confirmed by the tests to be redundant throughout the different specifications. In the GRGDPCAP equations, the same was true for the variable indicating the level of GDPCAP in 1970, as well as for the savings rate (SAVGDP) and the geographical bias (LOCK). Finally, the tests confirmed that the ratio of trade to GDP (TRADE), the ratio of the black market to the official exchange rate (PO), and the level of primary export dependency in 1970 (RAWGDP70) are irrelevant variables in explaining poverty alleviation.

The models presented in this paper were constructed following a very thorough process of selection of the independent variables because of economic theory as the basis of our hypothesis and because of their econometric significance in other empirical studies. Therefore, tests ran for omitted *known* variables always indicated the absence of such a problem. We used Ramsey's RESET test, however, to investigate the possibility of omitted *unknown* variables. The test did not reveal any serious problems associated with omitted unknown variables.

Tests for Outliers

For all the regressions that were estimated, Jarque-Bera statistics were calculated to test for the normality of the residuals. For some of the regressions, especially those used to estimate poverty alleviation, the existence of a few outliers affected the normal distribution of the residuals. However, in the spirit of not tinkering with the data, we preferred to leave these observations in the sample, and simply note the possibility that the results might be excessively influenced by a few extreme cases.

Stability Tests

In order to test formally for the stability of the models we used the recursive least squares procedure (CUSUM). For the TRADE equations, the results of this test, which looks at the cumulative sum of the residuals plotted around a zero line and within a standard errors band, showed that the CUSUM line fits consistently within the 5% critical line, thus suggesting parameter stability. The same results were obtained when testing for the stability of the parameters for the POVALL regressions. Recursive least squares tests are applicable only to OLS estimation, so they were not used to test for the stability of the GRGDPCAP equations.

Errors in Measurement of Variables

The potential inaccuracy of economic data is well known. While errors in the measurement of the dependent variable in general only increase the variance of the residuals, those in the measurement of the independent variables generate estimators that are subject to downward bias. There is often very little that can be done. Proxies are likely to be subject to at least as much error as the original variables. Furthermore, the Hausman test, which can be used to

estimate the importance of measurement error in a given variable, can do so only if the true value of the variable can be predicted with some accuracy. Since this is often not the case, the test is of questionable usefulness. Fortunately, the consequences are not too serious. If the hypothesis that is being tested takes the form of the alternative hypothesis that the estimated parameter is significantly different from zero, then the downward bias in the estimator is such that this hypothesis is less likely to be accepted, when it is in fact not true, than it would have been if there were no bias.

EMPIRICAL RESULTS

A. Factors Influencing Trade

In Table 1 we show the effects of structural, policy, and development variables on the relative importance of trade in the economy, as defined by the ratio of exports plus imports to GDP. The first regression suggests, as expected, that trade in relation to GDP is significantly

more important in smaller than in larger countries, defined in terms of population (POP). Furthermore, countries with higher population density (POPDEN) trade more than those with less pressure on their natural resource base. These two results are very robust and are confirmed in each version of the basic model presented in Table 1. The other size variable, GDP per capita, which is an indicator, together with population, of market size, is also negatively related to TRADE once a number of other, controlling variables are introduced. This result, too, is quite robust and suggests that the impact of domestic exploitation of economies of scale outweighs that of greater diversification of consumption as per capita income rises.

The second conclusion to be drawn from Table 1 is that each policy variable (PO, TT, OP) has a significant influence on the dependent variable TRADE, and that the sign of each coefficient is in the expected direction. Again, this is a fairly robust conclusion, with only the significance of the coefficient for OP falling to the 10 percent level in some of the equations. Thus it appears that each policy variable measures a somewhat different aspect of the policy environment, and that each aspect of this environment is important.

With respect to the development variables, the coefficient of institutional development (INST) is positive and highly significant in each regression. Years of schooling (SCHOOL) is significant in every case but one, that in which the natural resource base, as measured by RAWGDP70, is introduced. This appears to have more to do with the fact that the size of the sample is reduced from 215 to 169 observations than to multicollinearity[16] Finally, the density of the road network, as a proxy for physical infrastructure, does not appear to be significantly related to TRADE.

This is somewhat surprising, given the emphasis that development practitioners often place on lack of infrastructure inhibiting response of the export sector to policy change. Accordingly, we also investigated the relationship between TRADE and the ratio of the number of telephones to the total population, as a measure of telecommunications infrastructure.[17] This variable, too, was insignificant. Our interpretation, then, is that weak institutions and lack of human capital are much more important than inadequate physical infrastructure in explaining poor trade performance.[18]

Two other structural variables were introduced. The coefficient of RAWGDP70 is significantly positive, suggesting that trade is more important for countries with a substantial natural resource base. What is interesting is that the character of this trade is likely to differ from that resulting from high population density, which also contributes positively to trade. In particular, high population density leads to specialization in exports of manufactures whereas rich

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[16] The correlation coefficient between SCHOOL and RAWGDP70 is .001.

[17] This variable is available for a much shorter period of time and so was not used in place of, or together with, road density as an indicator of physical infrastructure.

[18] This corresponds to the findings of Stryker and Shaw (1994), who examined barriers to the expansion of nontraditional exports through use of a firm survey in Ghana and Madagascar. They found that most of these were institutional, e.g., administrative obstacles, lack of access to credit, poor quality control, transport monopolies. The one exception was weak telecommunications, but even here the problem was poor quality, often related to inadequate maintenance, rather than limited quantity.

natural resources result in greater exports of primary products. As we shall see shortly, the former is much more conducive to economic growth.

The other result that is somewhat surprising is that being landlocked does not seem to inhibit trade. This may be because trade with overseas countries is replaced by trade with neighbors or because transportation costs to and from the port are not sufficiently high to offset other factors conducive to trade. We do not know. Nevertheless, the fact that a greater share of unrecorded trade is likely to pass overland than through ports implies that this finding would not likely be reversed if the value of this trade were known, since trade is more likely to be underreported in inland than in coastal countries.

B. Factors Influencing Economic Growth

The results of the analysis of the factors affecting economic growth are presented in Table 2. It is clear from this table that total population size is positively related to the rate of economic growth. Larger countries, other things equal, grow more rapidly. This may be because of economies of scale, greater competitiveness, spillovers in learning as described by endogenous growth theory, or some other mechanism about which we know little. Nevertheless, the finding that this variable has a significant impact on economic growth is very robust.

The same cannot be said of convergence theory, which states that countries that start further behind in terms of per capita income have the "advantage of backwardness" in that they can profit from the advances in technology that have been made in richer countries. This theory is not supported in Table 2, where the coefficient for GDPCAP70 is never significant. The reason for poor countries not catching up is not that they have failed to employ open policies, since this variable is controlled for (Sachs and Warner, 1995a, 3). Rather, it appears to be due to the absence of certain preconditions for growth that are associated with the relative importance of trade, such as education and institutional development.

To test the convergence effect further we estimated the economic growth equation over twenty years from 1974 to 1993. The coefficient of GDPCAP70 was negative, as predicted by convergence theory, and significant at the 5 percent level until TRADE and POP were introduced as independent variables, in which case its significance fell to the 10 percent level. Furthermore, this coefficient proved highly unstable with respect to the particular specification of the model used. All of the other variables had the same signs as in Table 2, and most were significant and reasonably stable as well. The only other major difference between the two versions was the absence of any variables representing the effect of time in the twenty year regression, whereas the equations of Table 2 contain dummy variables for the last three five-
year periods. These suggest, other things equal, that economic growth throughout the developing world was unusually high during the period 1974-78, a time when the world

economy was expanding vigorously. Thereafter, economic conditions for most countries deteriorated – partly for reasons that we can explain in terms of the variables of the model, but also because the whole world economy was weaker, what with the debt crisis, inflation, and ultimately recession. Taking this into account, we find no evidence that countries that had a lower per capita GDP in 1970 were growing faster during any subsequent five year period, other things equal, than those whose per capita GDP was higher.[19]

One possible reason for this anomaly is that countries reacted differentially to changes in the world economy. The poorest countries, many of them in Africa, tended to benefit substantially from rapid expansion in the world's demand for primary products and from ready access to world capital markets during the early and mid 1970s. They also experienced economic decline in subsequent years when conditions in the world economy deteriorated. On the other hand, the middle-income countries, particularly those in Asia, were more insulated from these changes and grew more steadily. Whether this accounts for the difference in results concerning economic convergence will require further study. In any event, there is an argument to be made that countries that were poor tended to remain poor not only because of closed policy environments but also because they lacked some of the preconditions necessary for economic growth.

One of those preconditions might be reasonably favorable terms of trade. The results support the hypothesis that a positive change in a country's terms of trade results in increased economic growth. Not surprisingly, this effect is significant and highly robust with respect to alternative specifications of the model. It is relatively weak, however, since, according to Table 2, raising the trend in the terms of trade by one percent results in only a 0.04 percent increase in the rate of economic growth.

More important in terms of its quantitative significance on economic growth is the relative share in GDP of trade with the outside world. The coefficient for TRADE in the growth equation is positive and always significant at the 5 percent level. However, the role of trade in stimulating growth appears to depend on what type of trade is involved. Primary product based exports seem to be much less successful than those of manufactured goods. This is evidenced by the significantly negative coefficient of RAWGDP70. Whether this is due to a Dutch Disease phenomenon, to endogenous growth spillovers being more important for manufacturing than for primary production, to a supply response to policy reform that is greater in the industrial sector, or to some other reason is unclear.[20]

What is more surprising is that being landlocked does not diminish growth. This finding echoes the evidence presented above of no relationship between TRADE and geographic location, but it contrasts with evidence from Sachs and Warner (1996) that lack of access to the sea has a

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[19] Levine and Renelt (1992) find that, while the convergence hypothesis holds with initial secondary school enrollment held constant over the period 1960-89, it does not hold over the 1974-89 period, which is almost the same as the period of analysis here.
[20] This negative relationship is found in a sample of 97 developing countries by Sachs and Warner (1995b), who also explore some of its causes.

negative effect on growth. The difference does not seem to be due to the fact that the Sachs and Warner study covers a single period from 1970 to 1989, while ours breaks the data down into five-year increments. When we ran our growth equation over the entire period from 1974 to 1993, LOCK was not significant with any specification of the model.

The only policy variable that proves significant in influencing economic growth in the equations of Table 2 is OP, which is significant in every specification of the model in which it is introduced. This does not imply that the other policy variables (TT and PO) do not have an effect on growth, but rather that this effect operates through the variable TRADE. OP, however, affects growth in two ways. First, it increases the importance of trade, which in turn raises the rate of growth. Second, it also increases growth when TRADE is held constant. This is hardly surprising given that this policy variable has a substantial element that relates to market deregulation rather than to just an orientation towards trade.

The development variables (RL, SCHOOL, INST) were also tested and were not found to be significant in explaining growth of per capita GDP. Once again, this probably is because their influence is already captured by the variable TRADE.

The domestic rate of saving was tested as an explanatory variable and was found to be insignificant. This finding contrasts with that of Sachs and Warner (1996), who found the savings rate to be positively correlated with growth in per capita GDP. In this instance, our efforts to duplicate these results were rewarded. Analyzing growth over the entire period, the domestic savings rate was significant only until TRADE and POP were introduced into the regression.

C. Factors Influencing Poverty Alleviation

The results of the analysis of factors influencing poverty alleviation are presented in Table 3. Although the coefficient of population density (POPDEN) is at first significantly positive, once the policy variables are introduced, it becomes significantly negative, as expected. Thus poverty is greater where population presses harder on the natural resource base. On the other hand, the coefficient of the degree of urbanization (URB) is significantly positive. Even though population density is higher than in rural areas, cities offer the advantage of low-cost delivery of social services such as health, clean water, and education.[21]

The effect of per capita GDP on poverty alleviation is measured in two ways. The first is represented by the variable GDPCAP70, which indicates the level of per capita income just before the entire period analyzed from 1974 to 1993. This captures the very long term impact of income on poverty. The second indicator, GRGDPCAP10, is the growth of per capita GDP

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[21] Part of the high correlation between poverty alleviation and urban environment may be because the measure of poverty alleviation used here includes among its components access to some of these services.

over the ten years just prior to the period analyzed. This indicates the nearer term effect of economic growth on poverty alleviation. Each of these terms is highly significant. They suggest the importance of economic growth in alleviating poverty.

Somewhat surprisingly, TRADE does not appear to be a significant variable affecting poverty alleviation. This tends to refute the hypothesis that trade creates employment and generates income for the poor because it makes use of excess labor. However, this effect may not be measured very well because income is not included directly in the measure of poverty alleviation. It also may mean that the poor are not able to benefit fully from greater trade because their lack of access to capital and physical isolation prevent them from taking advantage of all the opportunities presented.

Despite the fact that TRADE is not a significant variable, two out of three of the policy variables (OP and TT) are generally significant, with signs that indicate that more open trade policies and lower trade taxes have a favorable impact on the poor -- over and above their effects on trade and growth. OP includes elements that have a particular impact on the poor, such as export restrictions and a socialist orientation, which might be particularly harmful in rural areas, where most of the poor reside. For similar reasons, TT adversely impacts the rural poor when exports are taxed.[22] Because of the way in which poverty alleviation is measured, without including any direct indicator of household income, we may not be capturing very well the short-term impact of policy reform on poverty, but in the long term the effects are clear. **Outward-looking, market-oriented policy reform increases trade and growth <u>and</u> helps to alleviate poverty.**

The development variables also play an interesting role in poverty alleviation. The coefficient of the institutional development indicator is positive and significant. This suggests that institutions play an important role in aiding the poor. Clearly this is the case for the delivery of social services. Lack of well developed institutions has been a critical factor impeding access by the poor to clean water, better health, and improved education. Even more important, however, is the road density variable. Since most of the poor live in rural areas, access to social services depends critically on a good network of roads. This is an important finding. Even if roads do not contribute much to trade and growth, they do help to alleviate poverty.

RAWGDP70 and LOCK were tested to see what impact, if any, they might have on poverty alleviation. None was found that was statistically significant.

Much more significant were the dummy variables, which grew in magnitude over time, suggesting that there are unexplained factors causing poverty to be reduced. This supports the findings of Berg *et al* (1994, 98-106) that the satisfaction of basic human needs has improved over time in Africa and Latin America even where there is some indication that per capita income may have decreased. This improvement may be due to technological innovations such as

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[22] To test this hypothesis, we also estimated the effect of export taxes alone on poverty alleviation. The coefficient for the ratio of export taxes to the value of exports was negative and significant.

improved vaccines and oral rehydration. It may also be because of a continuing efforts by dedicated workers to improve conditions for the poor.

CONCLUSIONS AND RECOMMENDATIONS

The empirical results provide strong support for most of the hypotheses set forth earlier. Above all, the results show the vital importance of outward-looking, market-oriented policy in promoting trade, growth, and poverty alleviation. All three policy measures have an important influence on the ratio of trade to GDP. This in turn exerts a positive effect on economic growth, which is important in alleviating poverty. In addition, more open policies (OP) have a positive impact on economic growth independent of their influence on trade, and both lower taxes and more open policies have a favorable effect on poverty alleviation independent of their influence, either direct or indirect via trade, on economic growth.

Among the development variables, education and especially institutional development are important in stimulating trade. The fact that the response of exports to policy reform has been slow in some countries may be primarily because of inadequate investment in human capital and in the institutional infrastructure required for trade. Lack of adequate physical infrastructure appears to be less of a problem, though more research is required before this can be said with certainty. The problem with existing infrastructure may be related more to quality than to quantity, and this in turn may be due to educational and institutional deficiencies.

The impact of these development variables on economic growth appears to be felt primarily through their effects on trade. However, multicollinearity between these variables and trade may mask some of their direct effects on growth. This is not true of their influence on poverty. Both road density and institutional development have a beneficial influence on poverty alleviation independent of their effects on trade and growth.

Concerning the effects of the structural variables, it seems clear that trade is most important for economies with small market size. On the other hand, higher population density contributes positively to trade because these countries are unable to satisfy their need for primary products from domestic sources alone. They are forced, therefore, to specialize in the production of manufactured goods, exchanging these for primary product imports. In the long run, this turns out to be highly beneficial, the results suggest, since countries that depend more on their natural resources for exports tend to grow less rapidly than those who base their exports on industrial goods. This is true despite the fact that the ratio of trade to GDP is higher in countries with more of an orientation towards primary product exports, and greater trade contributes positively to economic growth.[23]

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[23] From Equation VI in Table 1 and Equation V in Table 2, a one percent increase in the variable RAWGDP70 will increase TRADE by 0.2 percent, which will in turn increase the growth of per capita GDP by .8 percentage points. The direct impact on the growth of per capita GDP of a one percent increase in RAWGDP70, however, is -1.7 percentage points.

Somewhat surprising is the strength and robustness of the positive influence of population size on growth of per capita GDP. Other things equal, a one percent increase in the size of the population will result in an increase in the economic growth rate of almost one percentage point.[24] The mechanisms by which such gains are realized are not well understood. They may relate to the exploitation of economies of scale, to greater competition, or to an increase in the externalities associated with learning. More research is required here.

Also noteworthy is the lack of evidence for economic convergence. This is not because countries that start out with lower per capita GDP have pursued less open policies, since this variable is controlled for. There is some suggestion that the evidence for convergence over longer periods of growth might be due to the differential impact of changes in the world economy on different countries. More research is required, however, to verify this.

A number of additional findings are also important. As expected, improvements in the terms of trade have a positive effect on economic growth. This effect, however is relatively weak. More surprising is the finding that being landlocked, other things equal, impedes neither trade nor growth. This finding is very robust and contradicts that of Sachs and Warner (1996), which is that landlocked countries, other things equal, grow less rapidly than those with direct access to the sea. This is another area for further research, especially in view of the fact that unrecorded trade is probably relatively more important in landlocked countries.

The analysis also suggests that the rate of domestic savings has no influence on economic growth. Again, this contradicts other research (Sachs and Warner, 1996). In this instance, however, the results indicate that the savings rate drops out as a significant variable once population and the importance of trade are introduced into the growth equation. These variables, which are highly significant in the analysis of growth in this paper, have not been included in most other research.

With respect to poverty alleviation, it appears to be negatively correlated with population density, which is an indicator of pressure on the natural resource base. On the other hand, urbanization contributes positively to poverty alleviation, probably because it facilitates access to social services. Most important, however, is the very positive contribution that economic growth makes to poverty alleviation. The coefficient of this variable is highly significant in all specifications of the poverty alleviation equation.

Furthermore, outward-looking, market-oriented policies, which contribute to poverty alleviation through trade and growth, also have a direct beneficial influence on poverty. Alleviation of poverty is strongly correlated with low rates of trade taxation and with open trade and marketing policies. This is hardly surprising in view of the fact that poverty is greatest in rural areas and these policies tend to favor those in the countryside. It is also clear that there has

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[24] This does not imply that raising the rate of population growth will have similar effects on the growth of per capita GDP. The effect measured here is that of static differences in population size not that of the dynamics of population growth, which may be quite different.

been substantial progress towards poverty alleviation over time that has been independent of these various explanatory variables.

These findings have important implications for USAID and the other donors. First, they strongly support the emphasis placed by the donors on economic policy reform as indispensable for economic growth. Second, they show convincingly that economic growth, as well as policy reform, is highly beneficial for poverty alleviation. Third, they indicate that USAID's funding of projects to promote the expansion of nontraditional exports is justified in terms of its impact on growth. Fourth, they suggest that high priority be given to the development of financial, commercial, legal, promotional, fiscal, and other institutions. Fifth, they indicate that donors should support the promotion of industrialization for export. Finally, they show that construction, rehabilitation, and maintenance of rural roads has important implications for poverty alleviation.

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